Case Reports

Surgical Treatment of Right Atrial Myxoma

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*A 51-year-old man with a large right atrial myxoma underwent emergency surgical resection in our institute. The diagnosis of such tumors can be difficult, and their resection presents difficulties for the placement of the venous cannulae. We used a single cannula in the superior vena cava until fibrillation, and then we inserted a cannula into the inferior vena cava. We present this technique as a method of avoiding embolization. (**Tex Heart Inst J 2000;27:61-3**)*

Primary tumors of the heart are rare. They have been found in only 0.0017% to 0.19% of unselected patients at autopsy.[1,2] Seventy-five percent of these tumors are benign; 50% are myxomas. Of the myxomas, 75% to 80% are located on the left side of the interatrial septum.[3] Prior to the development of cardiac catheterization in 1951, intracardiac tumors were diagnosed only at autopsy. Since then, echocardiography has replaced cardiac catheterization as the mainstay of diagnosis, because of its noninvasive advantages.

The 1st successful excision of a left atrial myxoma was reported in 1955.[1] Right-sided cardiac myxomas present surgeons with a technical challenge because placement of the cannula for cardiopulmonary bypass can be difficult.

We report the presentation and management of a case of a large, right atrial myxoma, and we describe our technique of cannulation for cardiopulmonary bypass.

Case Report

In June 1998, a 51-year-old man presented with a 2-week history of New York Heart Association class III fatigue and dyspnea. He also reported a 3-month history of cough and night sweats, which had been treated with antibiotics. He had suffered from mild dyspnea for the past 2 years.

On examination, the patient was found to have mild central cyanosis and a mid-diastolic murmur with an occasional systolic click at the mitral and tricuspid areas. He was mildly anemic (hemoglobin = 9.7 gm/dL), and his erythrocyte sedimentation rate was high (87 mm at 1st hour). Echocardiography (Fig. 1) revealed a large right atrial tumor (diameter = 7 cm) on a long stalk that allowed it to prolapse through the tricuspid valve. Because the patient was found to be hypoxic (SaO_2 = 90% in room air), a perfusion scan of the lung was performed. The scan was normal, and the patient was taken to surgery urgently.

We exposed the heart through a median sternotomy and found that the right atrium was large and tense. The mass appeared to occupy the entire right atrium, except for a little space near the superior vena caval (SVC) attachment. The patient was heparinized, the SVC cannula was inserted, cardiopulmonary bypass was instituted, and the heart was cooled down to 28 °C. The inferior vena cava (IVC) space was not adequate for cannulation without subjecting the patient to the risk of tumor fragment detachment. We placed a purse-string suture in the right atrium near the IVC junction. When the heart fibrillated at 28 degrees, we cannulated the IVC at the lowest available space. The SVC cannula was subsequently adjusted to achieve complete bypass, which was followed by cold-blood cardioplegia.

We opened the right atrium with an oblique incision. The tumor was so large that it projected from the atrium. It was attached by a stalk to the posterior wall of the right atrium, near the IVC end (Fig. 2). We excised the tumor and the base of the right atrial wall. We then closed this meticulously, along with a previously undetected patent foramen ovale.

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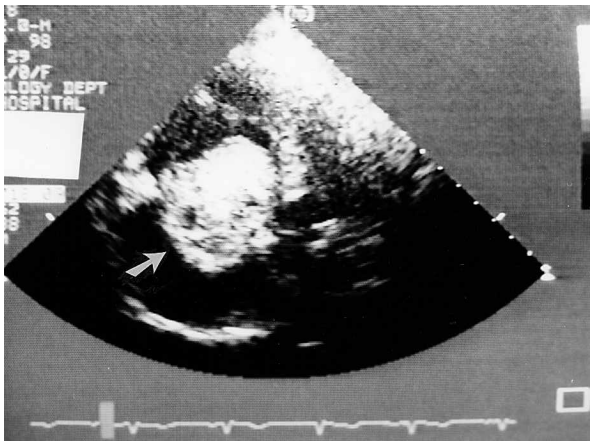

Fig. 1 *Echocardiogram (M-mode) shows the tumor (arrow) prolapsing through the tricuspid valve.*

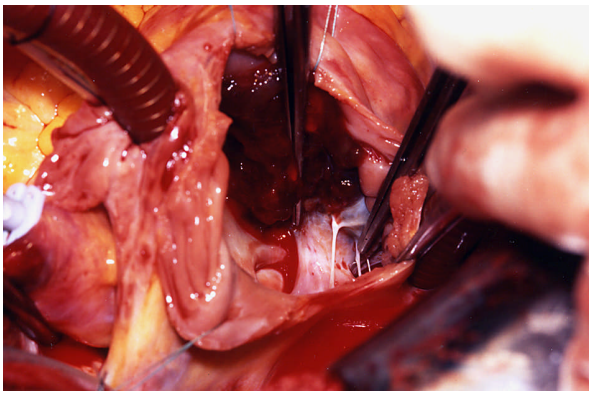

Fig. 2 *Intra-operative photograph of the tumor projecting from the right atrium. Its long stalk is attached to the posterior wall near the IVC.*

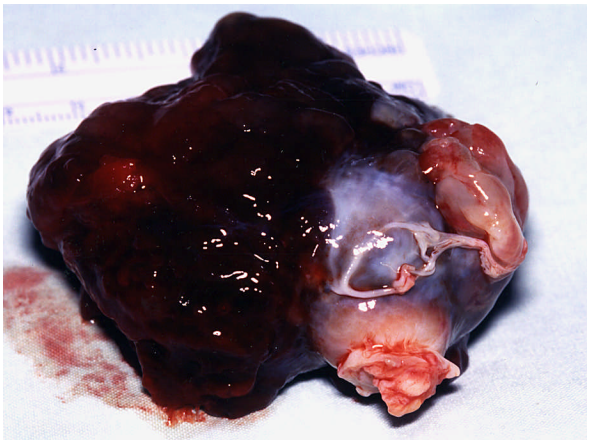

Fig. 3 *Photograph of the explanted tumor, a lobulated mass.*

The right atrium was closed during rewarming, de-airing was done routinely, and the aortic cross-clamp was removed. The heart came back into sinus rhythm, and cardiopulmonary bypass was discontinued gradually. The patient had an uneventful post-operative recovery.

Discussion

Right atrial myxoma accounts for only 15% to 20% of all cardiac myxomas. It is usually found in the interatrial septum,[1] at the border of fossa ovalis. Atypical locations and multiple myxomas occur most frequently in cases of familial myxoma.[4] Our patient's tumor was situated at the posterior atrial wall, adjacent to the origin of the IVC. This is a rare site of origination,[1,2] but familial history was absent in our patient. Myxoma can present in any age group, but, as in our patient, it occurs most often between the 3rd and 6th decades of life.[1,5]

Myxomas are usually polypoid and pedunculated.[1] Our patient's tumor had the usual polypoid mass and pedunculated structure, and it also had a lobulated surface (Figs. 2 and 3). It had considerable mobility, as shown by the transesophageal echocardiogram (Fig. 1): the stalk was 7 mm long and 12 mm in diameter. Myxomas are usually compact and show little tendency toward spontaneous fragmentation, although the less-common papillary or villous myxomas have a surface of multiple fine, villous extensions that tend to break off and produce embolism.[5] Because our patient presented with cyanosis and hypoxia, and we did not know the macroscopic appearance of the tumor, we had to exclude the presence of pulmonary emboli by performing a ventilation perfusion scan.

In light of our surgical findings, we can attribute the patient's desaturation and cyanosis to right-to-left shunting through the patent foramen ovale, because the mobile tumor was obstructing the tricuspid orifice, thus creating high right atrial pressure.[6,7] Right-to-left shunting serves as an overflow valve for venous return, so signs of right heart failure are often absent. Mobile myxomas often exacerbate shortness of breath when the patient assumes a particular posture,[8] but we could detect no such relationship. The motion of the tumor can damage the atrioventricular valve and rupture the chordae,[1] but our patient's tricuspid valve appeared normal. His anemia and high erythrocyte sedimentation rate can be explained by continuous destruction of erythrocytes due to the "ball-valve" movement of the mass.[1] Constitutional symptoms, including fever, malaise, weight loss, and myalgia, are common in patients with myxoma and have been attributed to the finding that myxomas release cytokine interleukin 6, which is responsible for inflammatory and autoimmune manifestation.[8,9] These signs disappeared after the tumor was excised.

The recurrence of myxoma was first reported by Gerbode[10] and has been noted by others.[11,12] Adequate excision of the entire mass, along with resec-

tion of normal tissue surrounding the base, prevents recurrence,[13] except in cases of familial myxoma. In addition, careful handling of the myxoma itself may prevent intracardiac implantation or peripheral embolization of the tumor fragments.[13-16]

In our case, the method of cannulation we have described was appropriate for such a large mass, in order to prevent embolization. Femoral cannulation is another option, but it incurs such risks as injury to the vein through which it travels, lymphorrhea at the groin, and deep vein thrombosis. That technique also requires that a snare or clamp be placed on the IVC-right atrial junction.

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